User Manual

TREK-550 A2/TREK-303

In-Vehicle Computing Box Smart Display

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If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
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3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna (cable over 20 CM)
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Technical Support and Assistance

1. Visit the Advantech web site at http://support.advantech.com where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- TREK-550 A2 series In-Vehicle Computing Box
- USB/Audio cable clip
- Warranty card
- Power cord: DC power inlet cable (180 cm - for TREK-550 A2 only)
- Video in/CAN cable
- “Drivers, Utilities and User Manual" CD-ROM
- End User License Agreement (XPE and WinCE model), please download driver and related document from http://support.advantech.com

Ordering Information

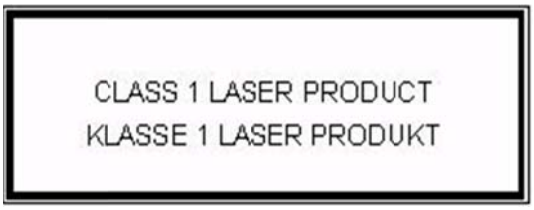
P/N	Description
TREK-550 A2-00A2E	Intel Atom Z510PT 1.1 Ghz , GPRS Bare Bone
TREK-550 A2-01A2E	Intel Atom Z510PT 1.1 Ghz , HSDPA / CDMA Bare Bone
TREK-550 A2-10A2E	Intel Atom Z520PT 1.3 Ghz , GPRS Bare Bone
TREK-550 A2-11A2E	Intel Atom Z520PT 1.3 Ghz, HSDPA / CDMA Bare Bone
TREK-303R-HA0E	7" vehicle display system, 800 x 480 resolution, with 4 wire resistive touch screen, 2-watts speaker.
1700018342	2-meter cable (paired with TREK-5XX)

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in an environment unconditioned where the storage temperature under -30° C (-22° F) or above 70° C (158° F), it may damage the equipment. Operating temperature: 50° C
8. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Position the power cord so that people cannot step on it. Do not place anything over the power cord.The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
16. CAUTION: The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace

only with same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacturers instructions.

17. THE COMPUTER IS PROVIDED WITH CD DRIVES COMPLY WITH APPROPRIATE SAFETY STANDARDS INCLUDING IEC 60825.



18. This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
    (1) this device may not cause harmful interference, and
    (2) this device must accept any interference received, including interference that may cause undesired operation.
19. CAUTION: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges.
20. CAUTION: Always ground yourself to remove any static charge before touching the motherboard, backplane, or add-on cards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.
21. CAUTION: Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. screws) provided with the accessory box.
22. Caution text concerning lithium batteries:

23. "Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:
    A) Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
    B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
    C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
    D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over current protection and supply wiring. Appropriate consid-

eration of equipment nameplate ratings should be used when addressing this concern.

E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips)."

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Warning!

1. *Input voltage rated: 6 ~ 36 Vdc.*
2. *Transport: carry the unit with both hands and handle with care.*
3. *Maintenance: to properly maintain and clean the surfaces, use only approved products or clean with a dry applicator.*
4. *CompactFlash: Turn off the power before inserting or removing CompactFlash storage cards.*

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Chapter 1

General Information

This chapter gives background information on the TREK-550 A2 In- Vehicle Computing Box.

Sections include:

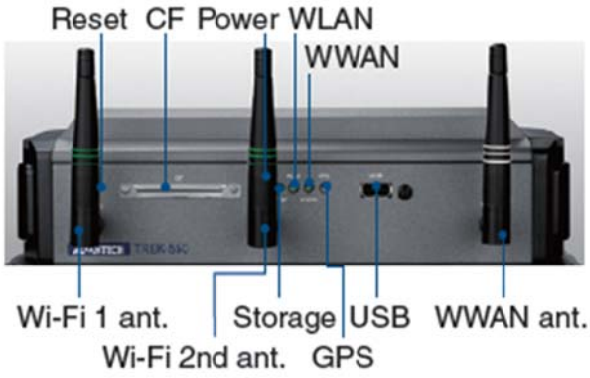
- **Introduction**
- **General Specifications**
- **Dimensions**

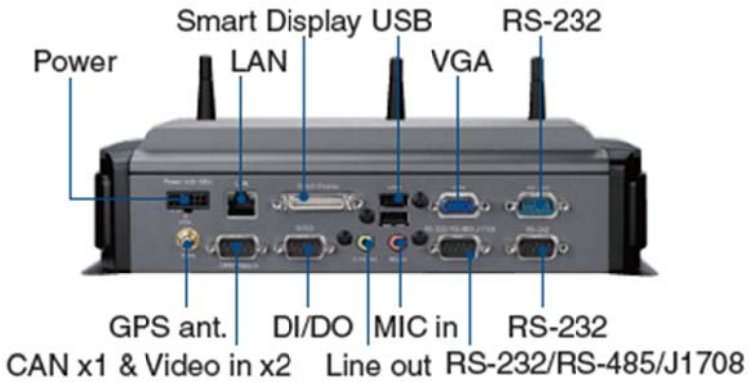
1.1 Introduction

The TREK-550 A2 is a dedicated box computer for industrial vehicle fleets, transport trucks, buses and taxis. TREK-550 A2 combined with variety of I/O connectors can be connected to devices like OBD-II or TPMS (Tire Pressure Monitoring System). Dual display/dual audio interfaces supporting different resolutions can deliver different applications to different displays; eg: one application to a fleet driver and another to a digital signage application.

Built-in wireless communications (WWAN) enable TREK-550 A2 to send important driver/vehicle/location/cargo information back to the control center. TREK-550 A2 can also operate in extreme environments with features like a wide working temperature range (-30° to 70° degrees). TREK-550 A2 also uses a special design to handle the crit- ical issue of in-vehicle power. Special power protection (ISO7637-2/SAE J1455 Class A/ SAE J1113) and car power management software (Ignition on/off, delay on/off, low battery monitor) prevent electrical noise and surges from impacting the system, guarding against damage from transient car power. TREK-550 A2 also supports rear view monitoring through the video in port. With this feature, a driver can monitor the environment on two sides of the truck for driving safety. TREK-550 A2 can also support dead-reckoning feature, which means the truck can still be traced even if the driver is driving in a tunnel.

I/O Connectors





1.2 General Specifications

Key features

- Supports Win CE 6.0, XPE, XP and Linux
- Automotive grade working temperature range (-30° C to 70° C)
- Rich I/O including CAN, LAN, RS-232, RS-485, J1708, isolation 4DI/4DO, Line out, Mic in, USB, and Video-in
- Built-in communication modules, including GSM/GPRS/HSDPA/CDMA
- GPS with AGPS and dead reckoning technology (Gyro & speed line)
- Certifications: CE/FCC/e-mark, MIL-SD810F, ISO 7637-2, SAE J1455, SAE J1113 regulations
- Dual display/audio output for both driver and passenger
- Ignition on/off delay; SW controllable for car power management

Specifications

- **Dimensions:** (W x H x D): 271 x 149 x 69.7 mm
- **Weight:** 4 kg
- **Vehicle power feature:**
  - Input voltage: 6 ~ 36 Vdc, support ignition cold crank
  - Supports Ignition on/off
  - Supports low battery shut-down protection threshold (optional)
  - Supports power off event delay
  - Supports power on delay
  - Supports power low delay
  - Supports power low hard delay
  - Supports hard off delay

Note! *For more detail of function please refer to Chapter 6, Section 6.3 of this manual.*

- **Enclosure:** Ruggedized aluminum without ventilation holes.
- **CPU:** Intel Atom Z510PT 1.1Ghz/ Z520PT 1.33 Ghz
- **Chipset:** Integrated in LE82US15EE
- **BIOS:** 4MB Flash BIOS, ACPI Compliant.
- **System memory:** One 200-pin SODIMM sockets, accepts up to 2 GB DDR2 667 SDRAM
- **Storage:**
  - CF: Supports one 50-pin socket for Compact-Flash type I/II (True PATA mode)
  - SSD/HDD (SATA) (optional)
- **Serial ports:** Two RS-232, 5 V @ 500 mA,12 V @ 250 mA, ping9, by jumper selected. One 4-wire RS232,1 x RS485, 1 x J1708 ports
- **Universal serial bus (USB) port:** Supports up to three USB2.0. One from smart display port
- **LAN port:** 1 x 10/100/1000 Ethernet (with LEDs) by RJ45

Note! *This product is covered by one or more of the following patents: US5,307,459, US5,434,872, US5,732,094, US6,570,884, US6,115,776 and US6,327,625.*

- **Video output:** 1 x VGA output by DB-15 (independent display).
- **Video in:** 2 x composite video input selection supported format (for rear view monitor) by RJ-45 connector
- **Mini PCI express bus expansion slot:** Accepts full size mini PCI bus card.
- **Watchdog timer:** Supports 0-255 sec. time intervals, SW programmable and SW enable/disabled.
- **RTC Battery:** 3.0 V @ 200 mAH lithium battery.
- **Power management:** Supports power saving modes including Normal/ suspend-to-disk modes.
- **Digital I/O:** Isolated 4 digital input and 4 digital output
- **CAN bus:** Support CAN V2.0B up to 500 kb/s.
- **Audio:** 2 audio codecs, one is for smart display, one is for TREK-550 A2 line out and mic in phone jack.
- **Optional modules:**
  - GPS:
    LEA-5S: 50 channels GPS
    LEA-6S: 50 channels GPS
    LEA-4R: 16 channels dead reckoning GPS
  - RF:
    Quad-band GSM/GPRS, HSDPA, CDMA
- **PCI Express Bus Ethernet Interface:** Ethernet: support 1000/100/10Base-T auto-sensing capability.
- **Operating temperature:** -30 ~ 70° C
- **Relative humidity:** 10 ~ 95% @ 40° C (non-condensing)
- **Shock:** 30 G peak acceleration (11 msec duration)
- **Certifications:** CE, FCC, CCC, Emark
- **Vibration:** 5 ~ 500 Hz SAE J1455 4.9.4.2, MIL-STD-810F 514.5

1.3 Dimensions

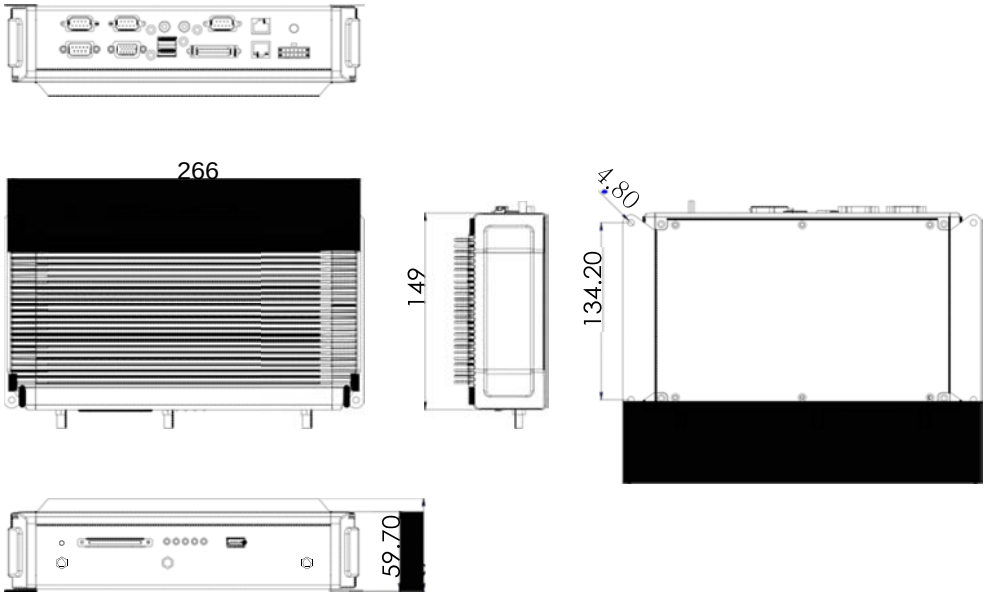


Figure 1.1 TREK-550 A2 dimensions

Chapter 2

System Setup

This chapter details system setup on TREK-550 A2.

Sections include:

- A Quick Tour of the Computer Box
- Installation Procedures
- Running the BIOS Setup Program

2.1 A Quick Tour of the TREK-550 A2 Computing Box

Before starting to set up the In-Vehicle Computing Box, take a moment to become familiar with the locations and functions of the controls, drives, connectors and ports, which are illustrated in the figures below. When the Computer box is placed inside truck glove cabinet or under the passenger's seat next to the driver, its front appears as shown in Figure 2.1.

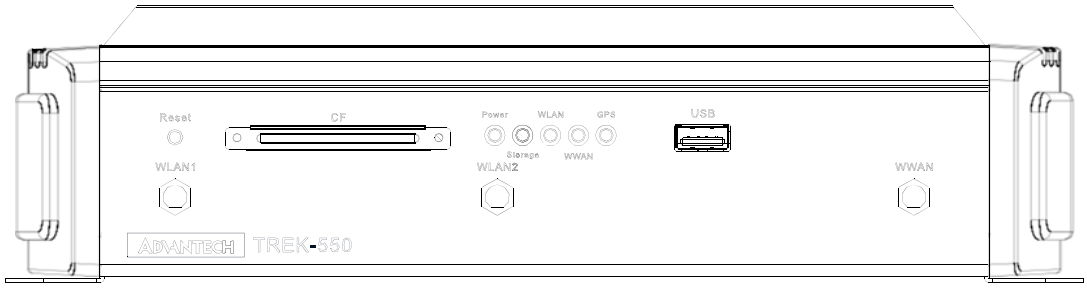


Figure 2.1 Front view of TREK-550 A2

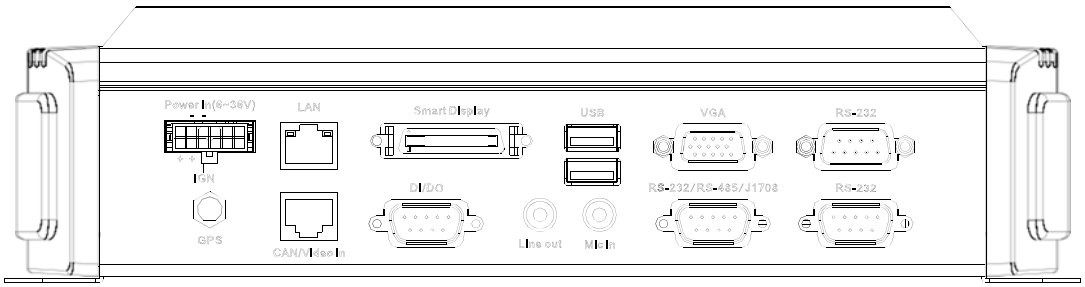
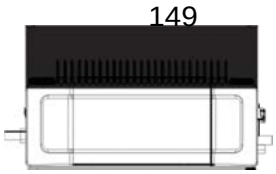
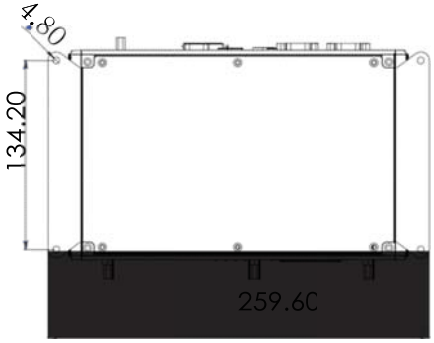


Figure 2.2 Rear view of TREK-550 A2



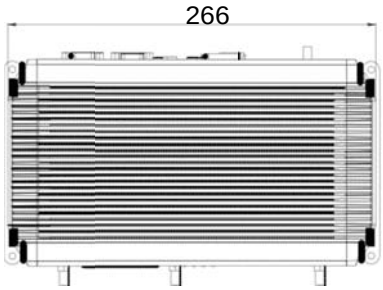
Unit: mm

Figure 2.3 Side view of TREK-550 A2



Unit: mm

Figure 2.4 Bottom view of TREK-550 A2



Unit: mm

Figure 2.5 Top view of TREK-550 A2

2.2 Installation Procedures

2.2.1 Connecting the Power Cord

Connect the three pin waterproof power cord to the DC inlet of the In-Vehicle Computing Box. On the open-wire end, one pin is reserved for positive voltage and is marked, "+"; one pin is reserved for ground and is marked, "-"; and, one pin is reserved for the ignition signal with an “ignition” mark.

Note! *Ignition on/off setting: The TREK-550 A2 supports an ignition on/off function so that you can power on/off the TREK-550 A2 via the ignition signal/voltage and connect the TREK-550 A2 vehicle ignition switch.*

Pin	Definition	Color
1	+	Red
3	-	Black
4	Ignition	Orange

2.2.2 Power Connector

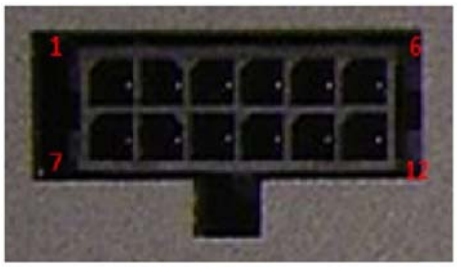


Figure 2.6 Power connector outlook

Pin	Signal	Pin	Signal
1	Chassis Ground	2	Ground
3	Ground	4	(Reserved)
5	(Reserved)	6	(Reserved)
7	Power Input (6 ~ 36 V_{DC})	8	Power Input (6 ~ 36 V_{DC})
9	Acc Ignition Input	10	Ground
11	(Reserved)	12	Power button Input

Connector : Molex 430451200

Mating connector: Molex 0430251200

Figure 2.7 Power connector photo

Note! *Fuse holder: The fuse holder on the power cable is water/dust proof; you may change the fuse (5 Amp) easily by yourself.*

2.3 Running the BIOS Setup Program

In most cases, the computer will have been properly set up and configured by the dealer or SI prior to delivery. However, it may still be necessary to adjust some of the computer's BIOS (Basic Input-Output System) setup programs to change the system configuration data, like the current date and time, or the specific type of hard drive currently installed.

The setup program is stored in read-only memory (ROM). It can be accessed either when turning on or resetting the computer, by pressing the “Del” key on the keyboard immediately after powering up the computer.

The settings that are specified with the setup program are recorded in a special area of the memory called CMOS RAM. This memory is backed up by a battery so that it will not be erased when turning off or resetting the system. Whenever the power is turned on, the system reads the settings stored in CMOS RAM and compares them to the equipment check conducted during the power on self-test (POST). If an error occurs, an error message is displayed on screen, and the user is prompted to run the setup program.

2.4 Installing the Drivers for Win XP

After installing system software, the computer is ready to set up the AMD chipset, VGA, audio, LAN, and touch screen functions. All the pre-requisite drivers are stored on a CD-ROM disc entitled “Drivers and Utilities” (Check the correct wording on the CD, which can be found in the accessory box.)

The utility directory includes multimedia programs. Some drivers and utilities in the CD-ROM disc have their own text files which help users install the drivers and understand their functions.

These files are a very useful supplement to the information in this manual. For more updated driver please refers to Advantech website, www.advantech.com/support

The drivers for TREK-550 A2 are listed as below, please just execute the drivers for installation

Device	Version
Intel SCH INF Update	8.8.0.1011
Intel US15 GMA500 Graphic Driver	6.14.11.1018
PenMount Universal Driver	2.1.0.263
Realtek RTL8111C 10/100/1000 PCI-E NIC	5.698.701.2008
Realtek ALC888 High Definition Audio	5.10.0.5804
FTDI FT4232 BUS USB Driver	2.6.0.0
ublox LEA-5S/4R Driver	1.2.0.5
Sierra Wireless MC5728V	Watcher 7.11
Sierra Wireless MC8090/8092	3GWatcher Build2258
Ralink RT3091 Wireless LAN Card (AW-NE768)	1.4.2.1
BT-203 Utility BlueSoleil (Optional)	2.1.3.0
TREK-550 A2 Command Line Utility 1.0	2010-04-14 Ver
Disable standby registry	-

Note! *The drivers and utilities used for the TREK-550 A2 are subject to change without notice. If you are in doubt, check Advantech's website or contact our application engineers for the latest information regarding drivers and utilities.*

Chapter 3

Hardware & Peripheral Installation

This chapter details the installation of hardware for TREK-550 A2.

Sections include:

- Overview of Hardware Installation and Upgrading
- Installing the Storage Device and Memory
- Installing Optional Accessories
- Fuse

3.1 Overview of Hardware Installation & Upgrading

The In-Vehicle Computing Box consists of a PC-based computer that is housed in a ruggedized aluminum enclosure. Any maintenance or hardware upgrades can be completed after removing the bottom cover plate.

Warning! Do not remove the ruggedized aluminum covers until verifying that no power is flowing within the computer. Power must be switched off and the power cord must be unplugged. Take care in order to avoid injury or damage to the equipment.

3.2 Installing the Storage Device and Memory

The In-Vehicle Computing Box can only use a Compact Flash Card (CFC) as a storage device. Put the CFC into the CF slot and insert the RAM into the 200-pin SODIMM socket on the main board.

3.3 Installing Optional Accessories

Optional accessories, like RAM mount kits or other functional modules are available for purchase to complement TREK-550 A2. The following are instructions for accessory installation.

3.3.1 Installing TREK-550 A2 Peripheral Modules

There are 6 screws on the bottom of TREK-550 A2, if you want to install the peripherals in TREK-550 A2, please use M2 type screw to open the system.

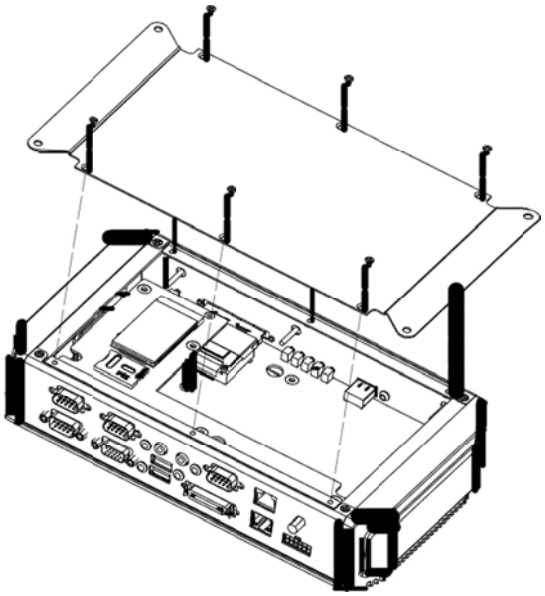


Figure 3.1 Install peripheral in the system

3.3.2 Installing the MiniPCI Type WWAN, SIM Card and Coin Battery

The WWAN module is on the Mini PCI slot can be easily installed, just undo the 6 screws from the bottom cover to install WWAN, SIM card, and battery.

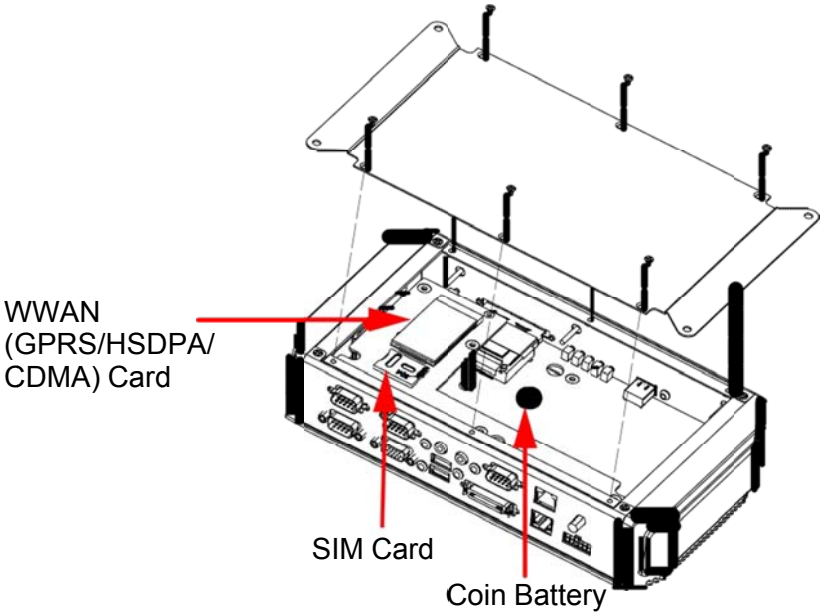


Figure 3.2 Mini PCI type WWAN module, SIM card and coin battery from bottom view

3.3.3 Installing CF Card

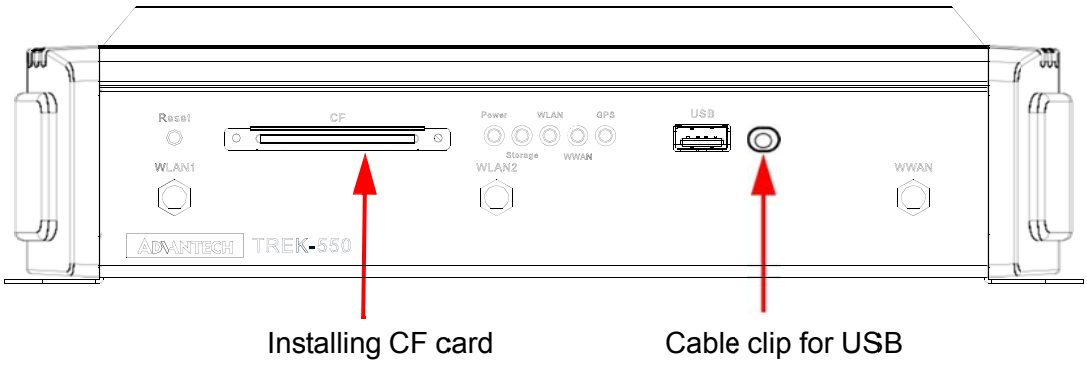


Figure 3.3 Installing CF Card

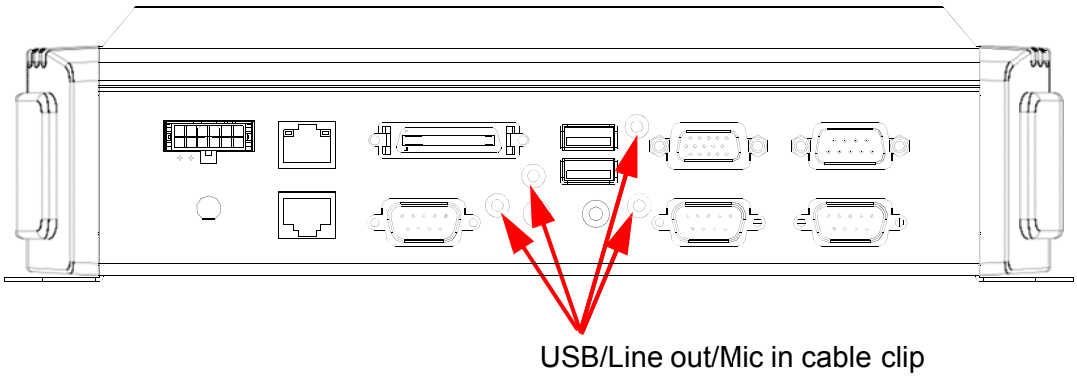


Figure 3.4 Install cable clip

3.3.4 GPS Module

The GPS module is not to be installed by the customer with breaking the warranty.

3.4 Paired with TREK-303 Specifications

See Appendix A

TREK-550 A2 provides both VGA function and LCD to connect with TREK-303, it can output different content, clone to VGA output.

Chapter 4

Jumper Settings and Connectors

This chapter explains how to set up the In-Vehicle Computing Box hardware, including instructions on setting jumpers and connecting peripherals, and how to set switches and read indicators.

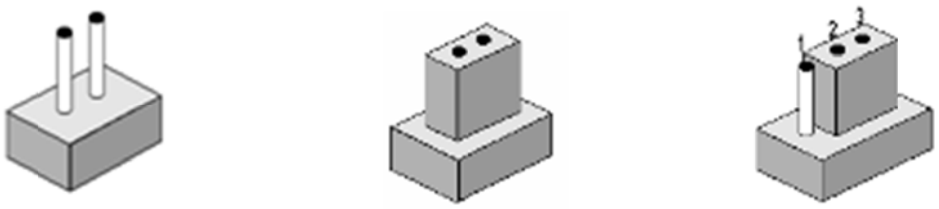
Be sure to read all the safety precautions before beginning the installation procedure.

Sections include:

- Setting Jumpers and Switches
- Jumpers Setting

4.1 Setting Jumpers and Switches

It is possible to configure the In-Vehicle Computing Box to match the needs of the application by resetting the jumpers. A jumper is the simplest kind of electrical switch. It consists of two metal pins and a small metal clip, often protected by a plastic cover that slides over the pins to connect them. To “close” a jumper, connect the pins with the clip. To “open” a jumper, remove the clip. Sometimes a jumper has three pins, labeled 1, 2, and 3. In this case, connect either pins 1 and 2, or pins 2 and 3.



Open Closed Closed 2-3

Open Closed Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers. If there are any doubts about the best hardware configuration for the application, contact the local distributor or sales representative before making any changes.

An arrow is used on the motherboard to indicate the first pin of each jumper.

4.1.1 Locations of the Jumpers and Connector

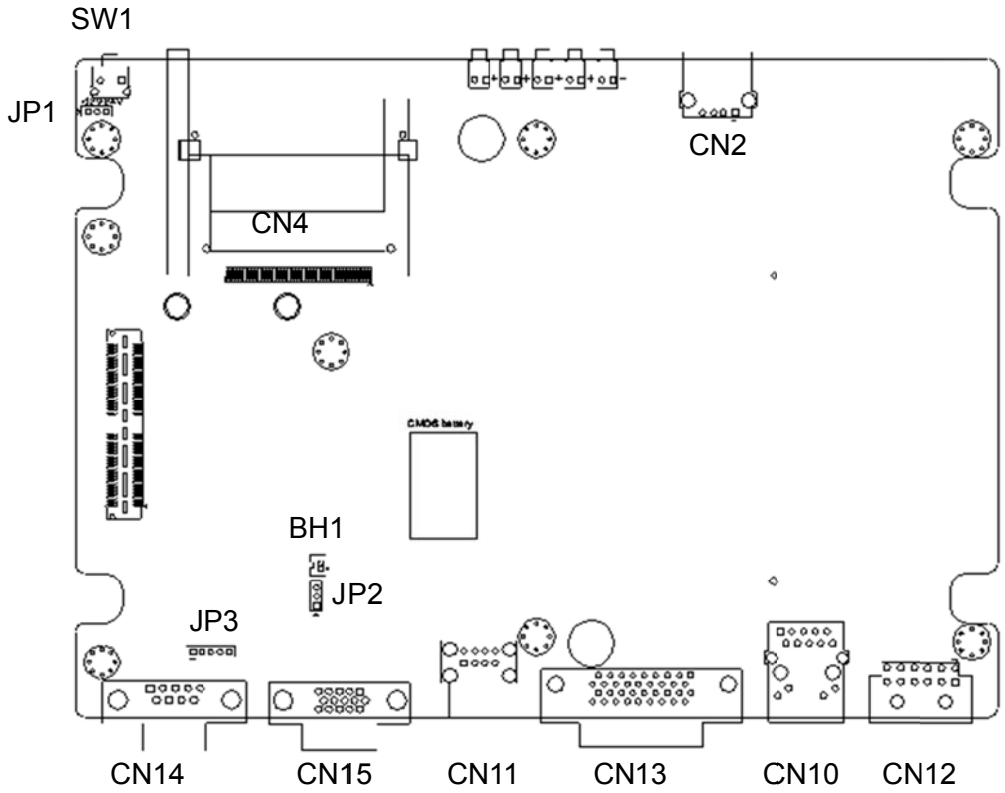


Figure 4.1 Locations of jumpers and connectors on top side the motherboard

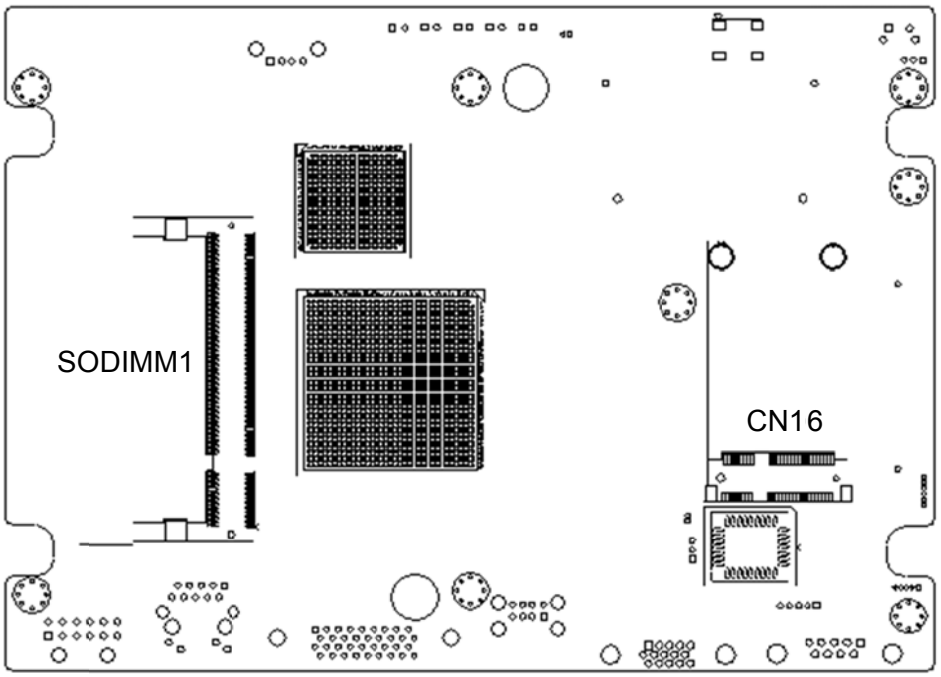


Figure 4.2 Locations of jumpers and connectors on bottom side of the motherboard

The figures below show the locations of the jumpers and connectors on daughter board used in TREK-550 A2.

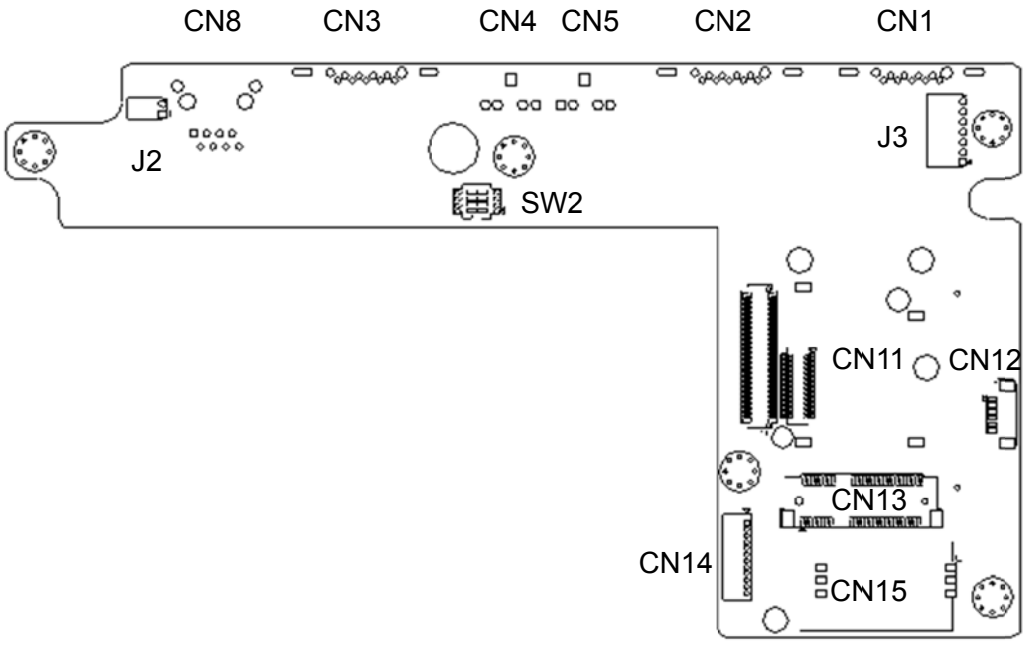


Figure 4.3 Locations of jumpers and connectors on bottom side of the daughter board

4.1.2 Jumpers

Table 4.1: Jumpers on Motherboard

Location	Function
JP1	Vehicle input voltage selection
JP2	CMOS clear for external RTC
JP3	Pin9 of COM3 function selection

Table 4.2: Jumpers on Daughter Board

Location	Function
J2	CAN bus termination selection
J3	Pin9 of COM8 function selection
SW2	DI/GPS Function selection

4.1.3 Connectors

On-board connectors link the In-Vehicle Computing Box to external devices such as hard disk drives. The table below lists the function of each connector.

Table 4.3: Connectors on Motherboard

Location	Function
SW1	RESET
CN2	USB connector
CN4	CF connector
CN10	LAN connector
CN11	USB connector
CN12	Power input connector
CN13	Smart Display Connector
CN14	RS-232 connector (COM3)
CN15	VGA connector
CN16	Mini-PCIe Socket (USB + PCIe interface) Mini card (standard interface)
BH1	RTC battery
SODIMM1	SODIMM connector for DDR2 SDRAM

Table 4.4: Connectors on Daughter Board

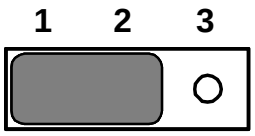
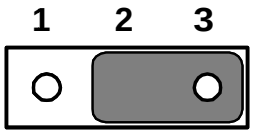
Label	Function
CN1	RS-232 connector
CN2	4-wire RS-232 + RS-485 + RS-1708 connector
CN3	Isolated Digital I/O connector
CN4	Line-Out phone jack
CN5	Mic-In phone jack
CN8	Video-In and CAN bus connector
CN11	WWAN module connector
CN12	Bluetooth module connector
CN13	Mini-PCIe Socket (USB interface, for WWAN module) Mini card (USB interface)
CN14	GPS module connector
CN15	SIM holder

4.2 Jumper Settings

4.2.1 CMOS Clear for External RTC (JP2)

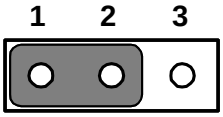
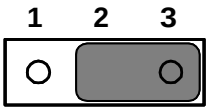
Warning!

1. *To avoid damaging the computer, always turn off the power supply before setting "Clear CMOS".*
2. *Set the jumper back to "Normal Operation" before turning on the power supply!*

Normal Operation (Default)	Clear CMOS
	

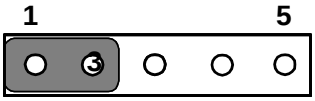
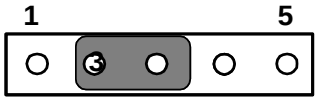
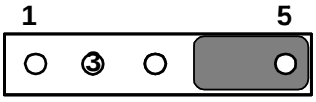
4.2.2 Power Input Voltage Setting (JP1)

TREK-550 A2 must be configured properly according the vehicle power input range.

12 V Input (Default)	24 V Input
	

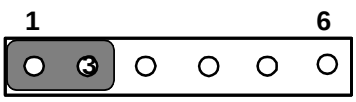
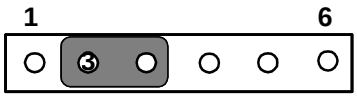
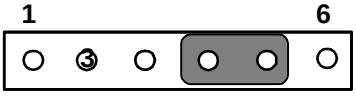
4.2.3 Pin 9 of COM3 Function Selection (JP3)

Pin 9 on COM3 port can be configured as RI, 5 V or 12 V output.

RI	+5 V_{DC} (max. 500 mA)	+12 V_{DC} (max. 250 mA)
		

4.2.4 Pin 9 of COM8 Function Selection (J3)

Pin 9 on COM8 port can be configured as RI, 5 V or 12 V output.

RI	+5 V_{DC} (max. 500 mA)	+12 V_{DC} (max. 250 mA)
		

4.2.5 DI/GPS Function Selection (SW2)

If the GPS module with Dead Reckoning function is used, the digital inputs 3/4 will be used as inputs of GPS module. DIP switch (SW2) is used to select the function on DI 3/4 (Digital Input 3/4).

Table 4.9: Pin 9 of COM8 Function Selection (J3)

	Digital Input	GPS (for Dead-Reckoning)
SW2.1	OFF	ON
SW2.2	ON	OFF
SW2.3	OFF	ON
SW2.4	ON	OFF

4.2.6 COM Port Interface

The computer provides ten serial ports in total for difference uses. Six of the ten serial ports (COM1~COM6) are implemented via the Super I/O chip and their physical address are fixed. The other four serial ports are via USB serial converter, and need driver support to work. Advantech provides WES (Windows Embedded Standard), WinXPe and Win CE 6.0 OS, the four USB-to-Serial serial ports are fixed from COM8 to COM11).

Table 4.10: Serial Port Function

Port	Function
COM1	2-wire RS-232 (TXD/RXD) for TREK-303
COM2	3-wire RS-232 (TXD/RXD/RTS) for Touch on TREK-303
COM3	Full functional RS-232
COM4	For power management control
COM5	RS-485
COM6	J1708
COM8	Full functional RS-232
COM9	4-wire RS-232 (TXD/RXD/RTS/CTS)
COM10	For WWAN module
COM11	For WWAN module

Table 4.11: Serial Port Settings

Port	Address Range	Interrupt
COM1	3F8 ~ 3FF	4
COM2	2F8 ~ 2FF	3
COM3	2E8 ~ 2EF	5
COM4	2D8 ~ 2DF	7
COM5	2E0 ~ 2E7	10
COM6	2D0 ~ 2D7	11

Chapter 5

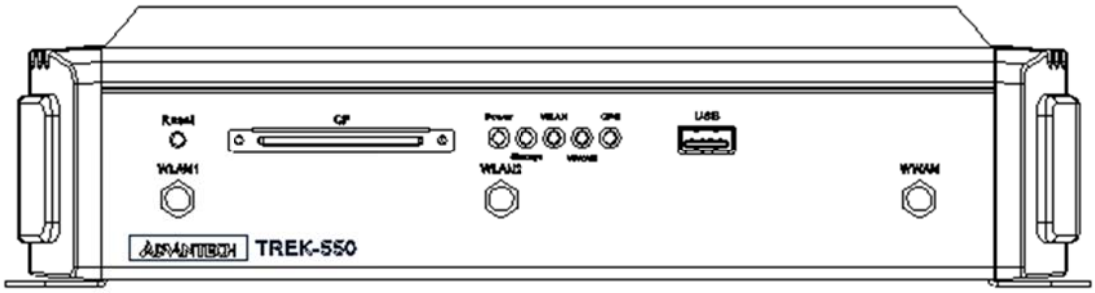
Pin Assignments

This chapter explains pin assignments on the TREK-550 A2.

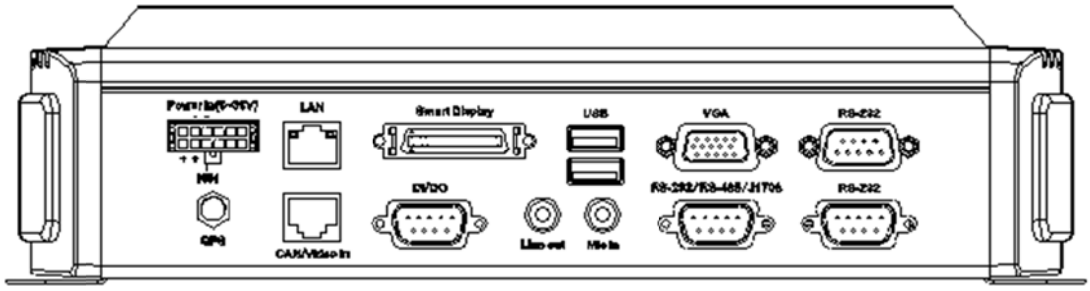
Sections include:

- Front/side Connector
- Power Connector
- Smart Display Connector
- RS232 Connectors
- DI/DO Connectors

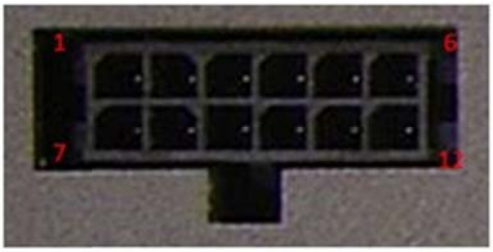
5.1 Front Side Connectors



5.2 Rear Side Connectors



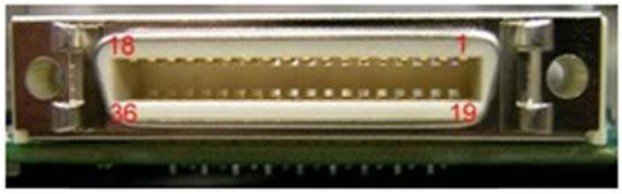
5.3 Power Connector (12/24 V; 6 ~ 36 V)



Molex Manufacturer part no. 0430451200

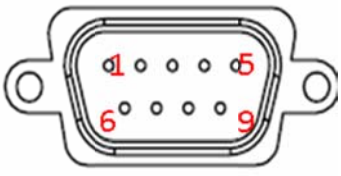
Pin	Signal	Pin	Signal
1	Chassis Ground	2	Ground
3	Ground	4	(Reserved)
5	(Reserved)	6	(Reserved)
7	Power Input (6 ~ 36 V_{DC})	8	Power Input (6 ~ 36 V_{DC})
9	Acc Ignition Input	10	Ground
11	(Reserved)	12	Power Button Input

5.4 Smart Display Connector



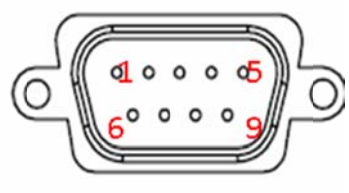
Pin	Signal	Pin	Signal
1	Backlight Enable output #	2	Panel Power Enable output #
3	LVDS Ground	4	Reset Button Input #
5	LVDS Clock +	6	LVDS Clock -
7	LVDS Ground	8	LVDS Ground
9	LVDS Data2 +	10	LVDS Data2 -
11	RS232 TXD1 #	12	RS232 RXD1 #
13	LVDS Data1 +	14	LVDS Data1 -
15	LVDS Ground	16	LVDS Ground
17	LVDS Data0 +	18	LVDS Data0 -
19	USB D-	20	USB D+
21	USB Ground	22	USB Ground
23	+12 V_{DC} output (+/- 5%, max 1A)	24	+12 V_{DC} output (+/- 5%, max 1A)
25	+12 V_{DC} output (+/- 5%, max 1A)	26	+12 V_{DC} output (+/- 5%, max 1A)
27	Power Ground	28	Power Ground
29	Power Ground	30	Power Ground
31	RS232 TXD2 #	32	RS232 RXD2 #
33	RS232 RTS2	34	Power Button Input #
35	Audio Ground	36	Mono. Line-out

5.5 RS-232 Connector (COM3, COM8)



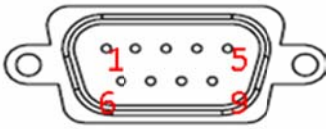
Pin	Signal	Pin	Signal
1	RS-232 DCD	2	RS-232 RXD
3	RS-232 TXD	4	RS-232 DTR
5	RS-232 Ground	6	RS-232 DSR
7	RS-232 RTS	8	RS-232 CTS
9	RS-232 RI / +5 V (max. 500 mA) / +V12 (max. 250 mA)		

5.6 RS-232 (COM9) / RS-485 (COM5) / J1708 (COM6) Connector



Pin	Signal	Pin	Signal
1	RS-232 RTS	2	RS-232 RXD#
3	RS-232 TXD	4	RS-232 CTS
5	Ground	6	RS-485 D-
7	RS-485 D+	8	J1708 D-
9	J1708 D+		

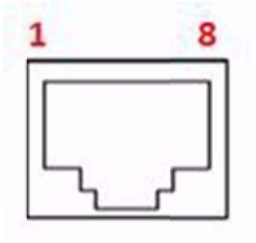
5.7 DI / DO Connector



Pin	Signal	Pin	Signal
1	Isolated Dry Contact Input 1	2	Isolated Dry Contact Input 2
3	Isolated Dry Contact Input 3 /Speed signal input for DR*	4	Isolated Dry Contact Input 4 /Forward signal input for DR*
5	Isolation Ground	6	Isolated Relay Driver Output 1
7	Isolated Relay Driver Output 2	8	Isolated Relay Driver Output 3
9	Isolated Relay Driver Output 4		

Note! *Regarding the setting of Pin3/4, please refer paragraph 4.2.5 (DI/GPS Function Selection).*

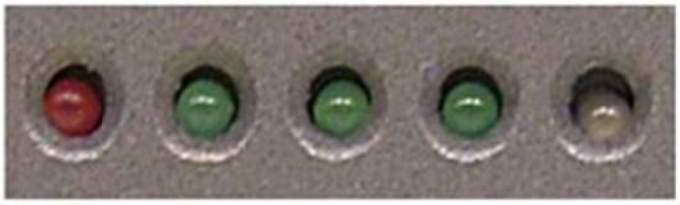
5.8 CAN / Video-In Connector



Pin	Signal	Pin	Signal
1	CAN_H	2	CAN_L
3	CAN_SHIELD	4	CAN_SHIELD
5	Video In 2	6	Video Ground
7	Video In 1	8	Video Ground

5.9 LED Indicator

System power indicator	The system power indicator is a red LED, controlled by hardware. When the system is in NORMAL mode, this LED will be lit up.
GPS activity indicator	The GPS activity indicator is a blue LED, and is used to show GPS activity. This LED is controlled directly by the GPS chips.
WLAN activity indicator	The WLAN activity indicator is a green LED, and flashes to show the activity of the WLAN module. This LED is controlled directly by the WLAN module.
WWAN activity indicator	The WWAN activity indicator is a green LED, and flashes to show the activity of the WWAN module. This LED is controlled directly by the WWAN module.
Storage Activity indicator	The storage activity indicator is a green LED, and flashes to show the activity of CF/HDD/SSD.



Red (Power) Green (Storage access) Green (RF data transfer) Green (RF link) Blue (GPS Operation)

Chapter 6

Software Demo Utility Setup

This appendix explains the software demo utility for TREK-550 A2.

Sections include:

- Introduction
- How to Set up Demo Utility

6.1 Introduction

To make the hardware easier to access for programmers, Advantech has developed a demo utility in order to let customer test the functions on TREK-550 A2. This document describes detailed information for each Advantech demo utility so that application developers can become more familiar with using them.

For technical support, contact Advantech application engineers worldwide. For news updates, visit our website: www.advantech.com

6.1.1 Execute J1939 Demo Utility

This section explains how to install the Advantech demo utility in Windows XP Pro / Embedded.

1. Execute the test program called “IMC_Demo”

Figure 6.1 IMC demo utility

2. Click J1939: customer may connect directly to the truck; we use a car simulator board below to explain how J1939 protocol can be executed.
   First, connect to the simulator board to TREK-550 A2 CAN port and console PC, once the simulator is powered on (connect to the truck), you can start getting the data, just click [Read], you may get the data you need from the car simulator, click [Read], you may transfer the data to Console.

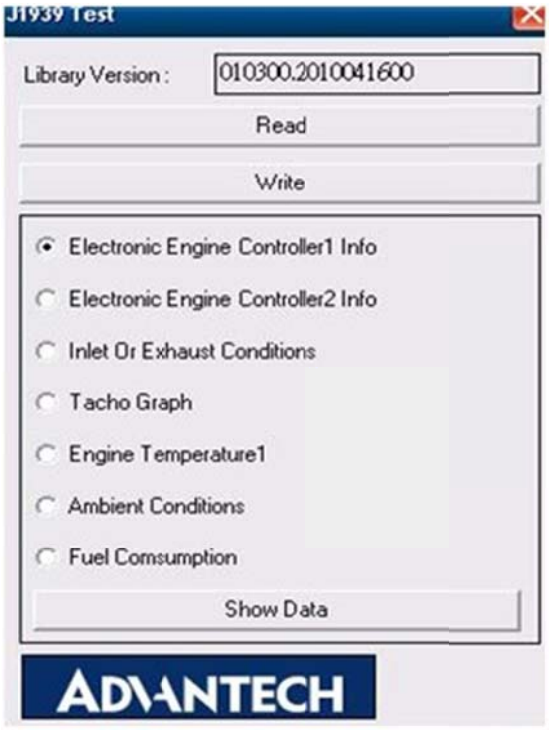


Figure 6.2 J1939 test - 1

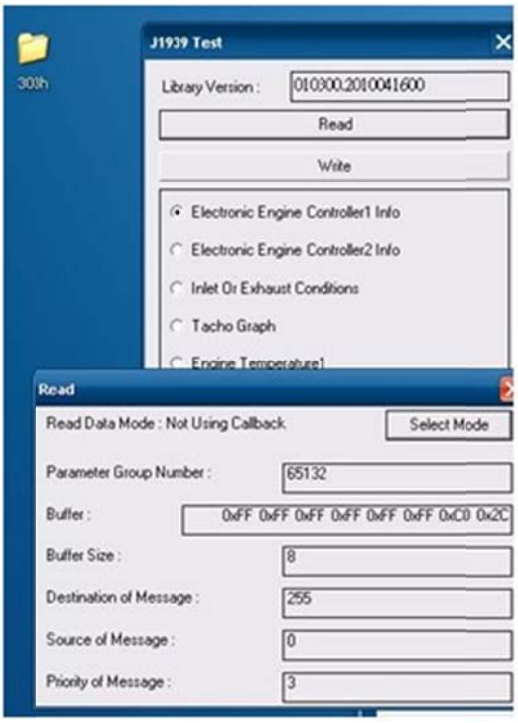


Figure 6.3 J1939 test - 2

6.1.2 Execute CAN Demo Utility

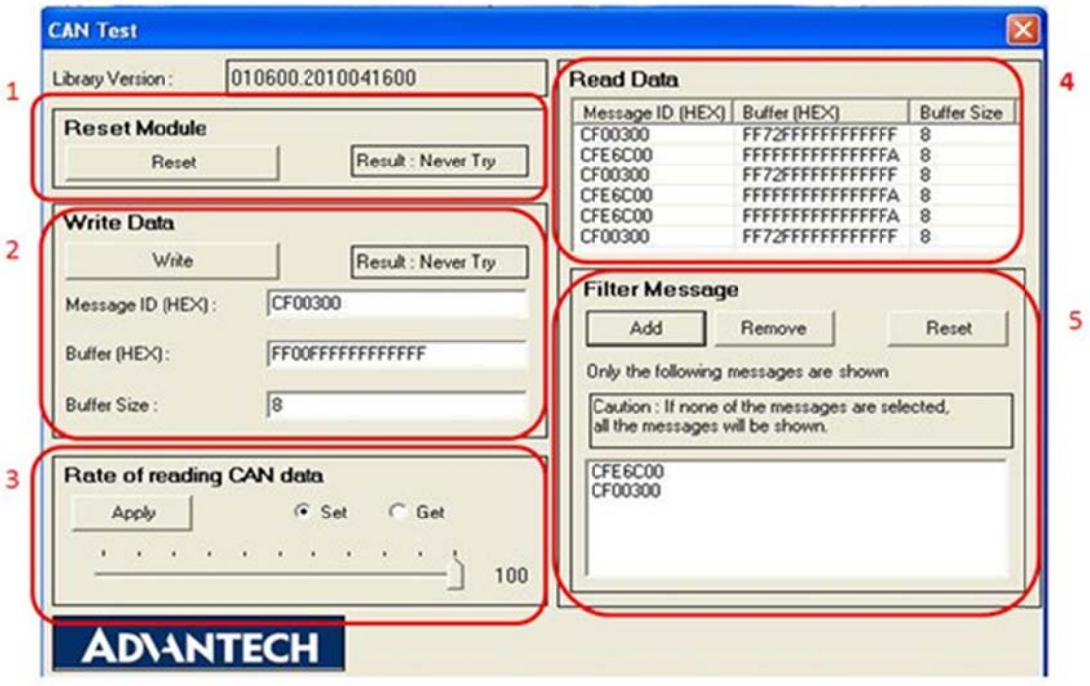


Figure 6.4 CAN test

1. Reset the module
2. Transmit CAN message
3. Set the polling rate of CAN message reception
4. Received CAN message.
5. Set up the filter of CAN message (only show the message ID)

6.2 RTC Test

Execute “RTC test”

1. **For RTC Time setting**: You may set year, month, date, and time show as below.

Figure 6.5 RTC test - 1

Figure 6.6 RTC test - 2

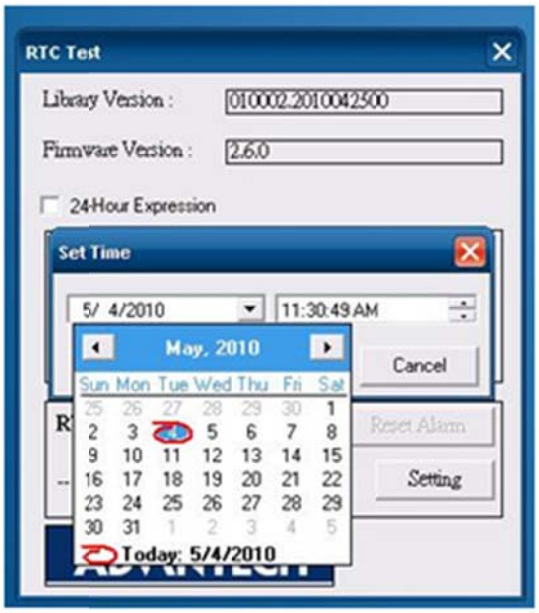


Figure 6.7 RTC test - 3

Figure 6.8 RTC test - 4

2. RTC Alarm Setting: You may also set Alarm time; you may wake up the system by the time you have set. Please refer to below figure 6.

Figure 6.9 RTC test - 5

6.3 Vehicle Power Management

6.3.1 Power Management Mechanism

The feature of Vehicle Power Management (VPM) is provided for users to fulfill the special requirements on in-vehicle applications.

- Ignition on/off
  - Turn on the system by ignition

    For the cases of in-vehicle applications, an ignition signal is often used to turn on or shutdown the system. When the system is in an OFF state and ignition is turn ON, the VPM controller will countdown ON_DELAY; once it counts to zero, the system will be turned on.
  - Shutdown the system by ignition

    When the system is powered on and the ignition is turn off, the OFF_EVENT_DELAY will start to count down. During this stage, if the ignition is back to ON, the VPM controller will stop countdown and reset the OFF_EVENT_DELAY value. If OFF_EVENT_DELAY counts to zero, the VPM controller will send an event (power button press) to the system and start to count HARD_OFF_DELAY. Application programs could watch this event to do pre-defined tasks, like storing data and preparing to turn off the system.

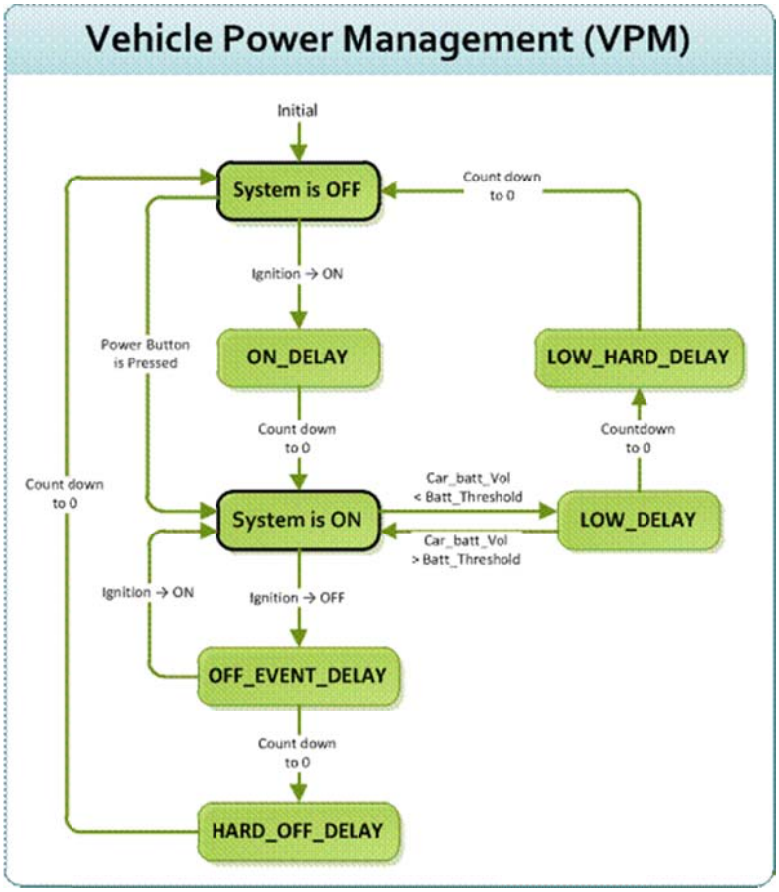
    Once going into the HARD_OFF_DELAY stage, this process will be irreversible. And if HARD_OFF_DELAY counts to zero, the system power will be cut off abruptly.
- Low battery protection

  To avoid draining out the car battery, low-battery protection is involved to ensure the car battery is capable to start the vehicle. When the system is ON, the VPM controller will monitor the car battery voltage. If the battery voltage is lower than a programmable threshold (LOW_THRESHOLD), the VPM controller will go into

LOW_DELAY stage and start to count down. During the stage of LOW_DELAY countdown, if battery voltage is back above LOW_THRESHOLD, the VPM controller will stop counting down and exit. If LOW_DELAY counts to zero, the VPM controller will send an event (power button press) to notify the system, go into LOW_ HARD_DELAY stage and start to count down. Once LOW_ HARD_DELAY counts to zero, the VPM controller will cut off the system power abruptly to avoid draining out the car battery.

The table below lists the user programmable parameters for VPM features:

	Default value	Acceptable range
ON_DELAY	2 seconds	1 ~ 18000 seconds
OFF_EVENT_DELAY	5 seconds	1 ~ 18000 seconds
HARD_OFF_DELAY	60 seconds	1 ~ 18000 seconds
LOW_THRESHOLD (12V mode)	11.42 V	10.09 ~ 12.25 V
LOW_THRESHOLD (24V mode)	22.44 V	21.11 ~ 23.28 V
LOW_DELAY	30 seconds	1 ~ 3600 seconds
LOW_ HARD_DELAY	60 seconds	1 ~ 3600 seconds



6.3.2 Power Management Utility Program

Execute IMCDemo.exe file, see the icon below.

6.3.3 Power Management Parameter Settings

The parameters for power management on TREK-550 A2 could be read or modified by
Demo utility (see the image below) or SDK/API.

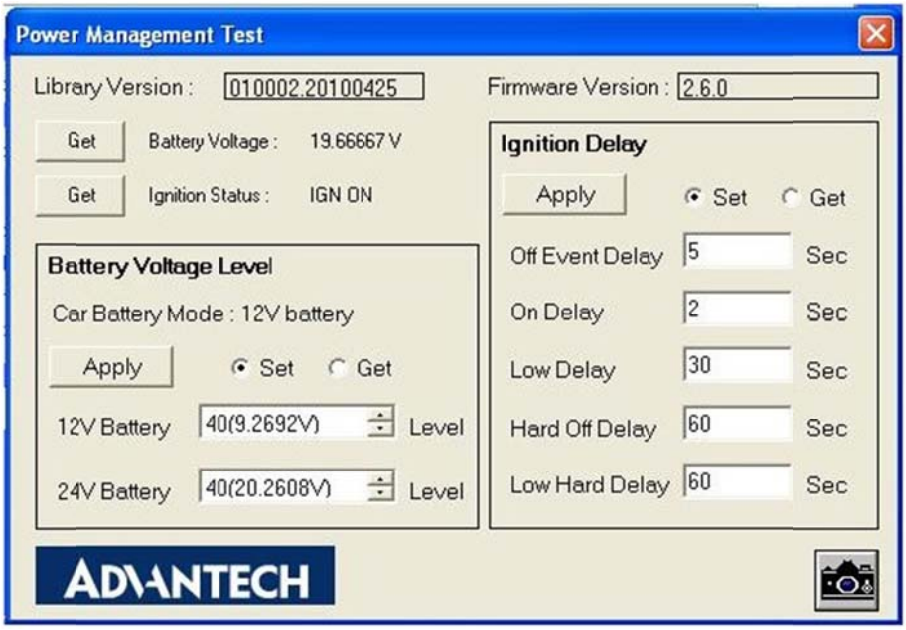


Figure 6.10 Power management test utility

6.3.4 TREK-550 A2 Power Consumption

OS: Windows Embedded Standard
Burn-in test V6.0

	Idle Mode	100% Burn-in Test Mode	Off mode (S5)
w/o TREK-303H	12 V / 1.04 A	12 V / 1.20 A	12 V / 1.75 mA
w/ TREK-303H	12 V / 1.51 A	12 V / 1.94 A	

*Doesn't support S1, S3, S4

6.4 GPIO Test

1. To execute the I/O Test, connect GPIO loopback, click Pin0, connect the end which reads the signal, the bulb should light up, like wise to Pin1~Pin3. Next check the Digital output box to execute the same procedure. See figure 6.

Figure 6.11 DI/O test

a. Digital Output ==> isolated relay driver output
b. Digital Input ==> isolated dry contact input

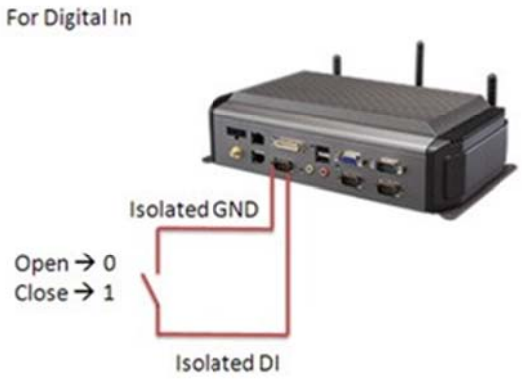


Figure 6.12 Digital in

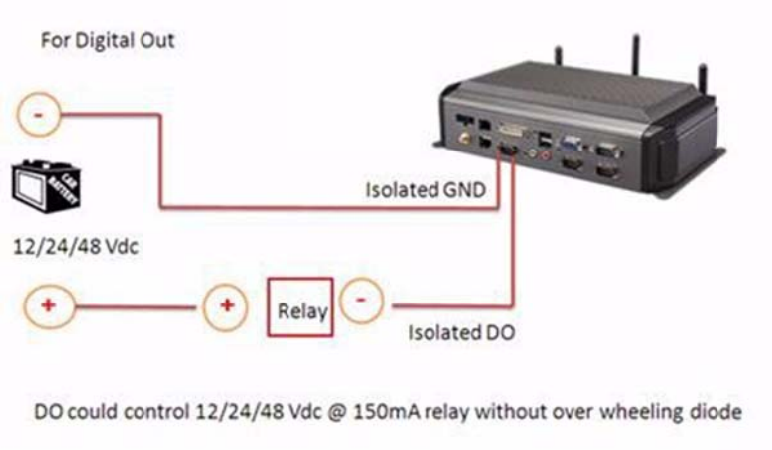


Figure 6.13 Digital out

6.5 Video in Test

There are two video inputs, please connect camera to each port, CAM1 & CAM2. Choose Channel 1 on [Switch to], then the panel will show the image which camera1 has taken, and it will recover to the same status after 10 sec, then change to Channel 2. The Panel will then show what appears on camera2, and come back to the same status after 10 sec.

Figure 6.14 Video test utility

6.6 Dead Reckoning

Dead reckoning (DR) supplements GPS satellite position information with heading and distance data provided by additional sensors. When GPS satellites are out of sight, location is extrapolated using distance and angle information from the sensors. DR enables accurate navigation even in locations with poor or absent GPS signals such as tunnels, indoor parking facilities and deep urban canyons. In addition, DR effectively eliminates the impact of multi-path effects in urban canyon environments.

6.7 G-sensor (3-axis Accelerometer)

A 3-axis accelerometer is integrated in TREK-550 A2. This could be used to characterize driver behavior such as hard accelerations, braking, and cornering.This also can tell users other significant information that can be used in accident reconstruction etc. A code example is provided for customer reference regarding how to access and con- figure G-sensor. G-sensor is located on the motherboard inside the TREK-550 A2. Please refer the link (http://www.analog.com/static/imported-files/data_sheets/ ADXL345.pdf) for the G-sensor datasheet.

Appendix A

TREK-303

This appendix explains the TREK-303 detailed information.

A.1 TREK-303 Specifications

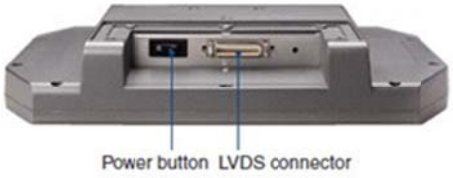
Display	Models	TREK-303R-LA0E	TREK-303R-HA0E
	Design compatible models	Paired with TREK-510	Paired with TREK-550
	A2 Resoultion (pixel)	480 x 234	800 x 480
	Number of colors	262 K (supports 18-bit)	262 K (supports 24-bit)
	Pixel pitch	0.107(W) x 0.37 (H)	0.2168(H) x 0.2168 (V)
	Brightness (cd/m^2)	500 (typical) without touchscreen	500 (typical) without touchscreen
	View angle (R/L/B/T)	70°/70°/60°/60°	70°/70°/60°/60°
	Contrast ratio	300	500
	Lamp life (hrs)	10,000 (min)	50,000 (min)
	Lamp type	CCFL	LED
Touchscreen	Touchscreen	4-wire resistive (GFG 4-wire design reserve)	
Front plane	Speaker	2 watts	
	Hotkey	Supports 5 hotkeys (user defined)	
	Brightness control	Light sensing (default), manually controlled by button (optional)	
	USB host	x 1	
Backplane	Power/wake up button	Yes	
	Reset button	Yes	
Power	DC input	12 V ± 5%	
	Power Consumption	~ 8 W (Max.)	~ 7 W (Max.)
Mechanical	Mounting	Design compatible with RAM mount	
	Material	PC	
	Weight	1 kg	
	Dimensions	244 x 160 x 41 mm	
	IP rating	IP54 (without I/O connector)	
Environment	Operating temperature	-30 ~ +70° C	
	Storage temperature	-40 ~ +80° C	
	Vibration	MIL-STD-810F, SAE J1455 4.9. 4.2	

Note!

1. *The Brightness control is adjusted by the auto light sensor in the front panel as default; it is also defined by button on the front panel by manual.*
2. *The color LCD display*

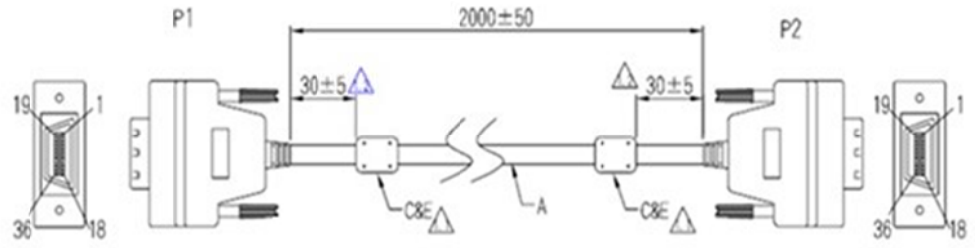
A. USB Host
B. 5 programmable hotkeys
C. D. Brightness control
E. Power LED
F. Light sensor
G. Speaker

Note: Backlight off: Press C button to the lowest level



Pin out for TREK-303 LVDS connector

Pin	Signal	Pin	Signal
1	Backlight Enable input #	2	Panel Power Enable input #
3	LVDS Ground	4	Reset Button Input #
5	LVDS Clock +	6	LVDS Clock -
7	LVDS Ground	8	LVDS Ground
9	LVDS Data2 +	10	LVDS Data2 -
11	RS232 RXD1 #	12	RS232 TXD1 #
13	LVDS Data1 +	14	LVDS Data1 -
15	LVDS Ground	16	LVDS Ground
17	LVDS Data0 +	18	LVDS Data0 -
19	USB D-	20	USB D+
21	USB Ground	22	USB Ground
23	+12 V_{DC} input (+/- 5%, max 1 A)	24	+12 V_{DC} input (+/- 5%, max 1 A)
25	+12 V_{DC} input (+/- 5%, max 1A)	26	+12 V_{DC} input (+/- 5%, max 1A)
27	Power Ground	28	Power Ground
29	Power Ground	30	Power Ground
31	RS232 RXD2 #	32	RS232 TXD2 #
33	RS232 RTS2	34	Power Button Input # (connect with system box)
35	Audio Ground	36	Mono. Line-in



Pin assignment

P1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
P2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Color	Brown	White	Ground	Brown	red	white	Ground	Ground		white	red		yellow	white	Ground	Ground	Green	white

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Blue	white	Ground	yellow		Blue	Purple	Grey	white	Black	Black Brown	black red	Orange	Black Yellow	Black green	Black blue	Black purple	Black grey

TREK-303 Hotkey Utility

Execute IMC demo utility

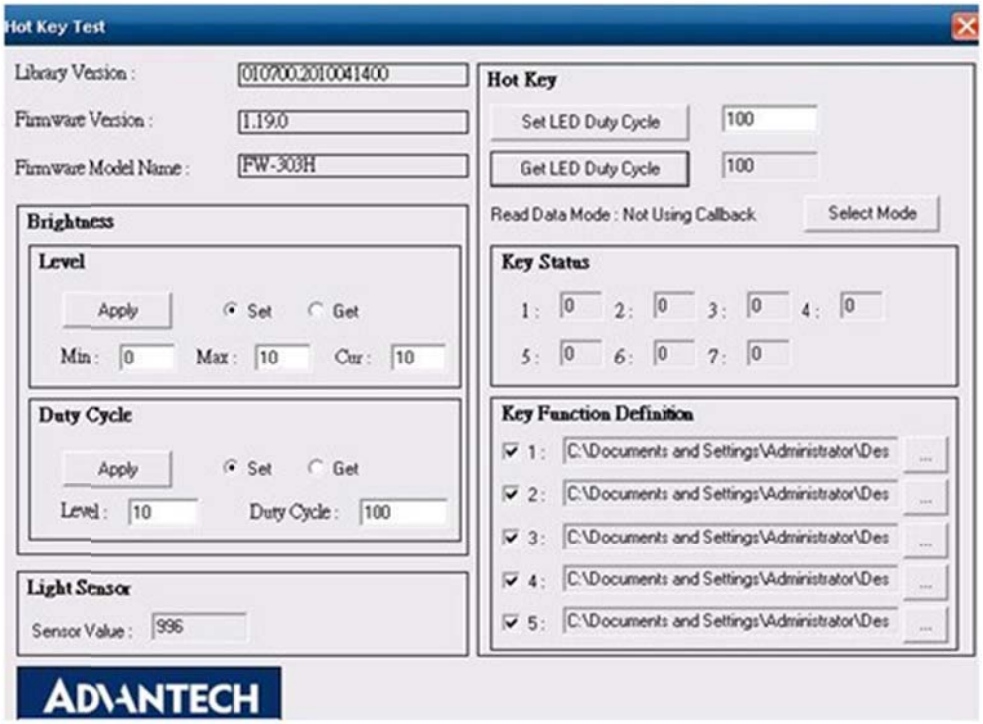


Figure A.1 Hotkey utility

1. Execute “Hot Key test” program →
2. Brightness level: You may set a panel’s brightness from level 0 ~10, up to a total of 10 levels, when you finish setting the brightness level you want, please click “Apply”. If you want to check the current brightness level of TREK-303, please click “Get”.
3. Duty cycle: You may set every level’s brightness strength, to a total 10 levels, when you finish setting the brightness strength for each level, please click “Apply”. If you want to check the current brightness strength on certain level of TREK-303, please click “Get”.
4. Light sensor: When the sensor has detected the change of the brightness in the environment, the value will change. The lowest level of brightness, the lowest value it is presented. On the contrary, the highest level of brightness, the highest value it is presented.
5. Hotkey: the backlight brightness of hotkeys could be adjusted by setting the value from 0 ~100.
6. Key Status: When you press Hot key, the status will change from 0 to 1.
7. Key function Definition: Set the parameters to connect to the application program function of the hot key.

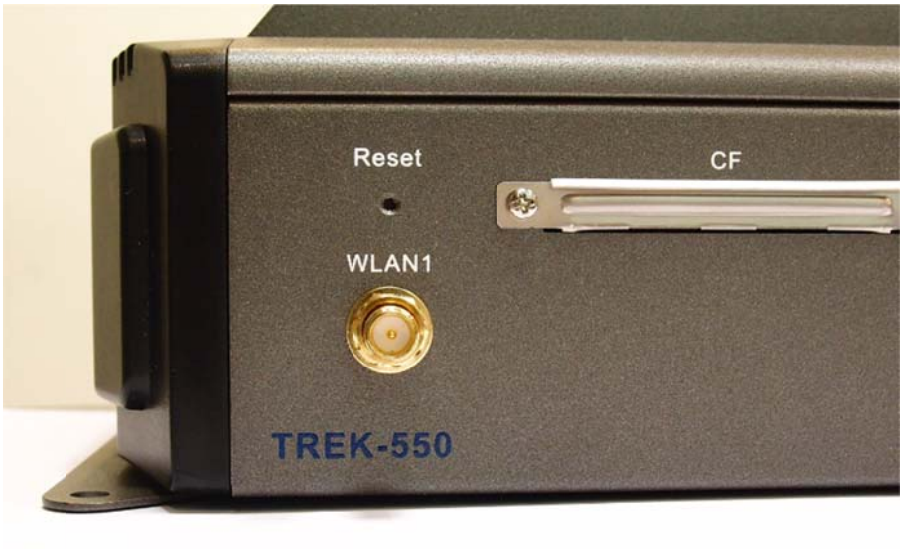
TREK-550 Antenna Installation

Dipole Antenna

Combo Antenna

TREK-550 SMA Connector type notice:

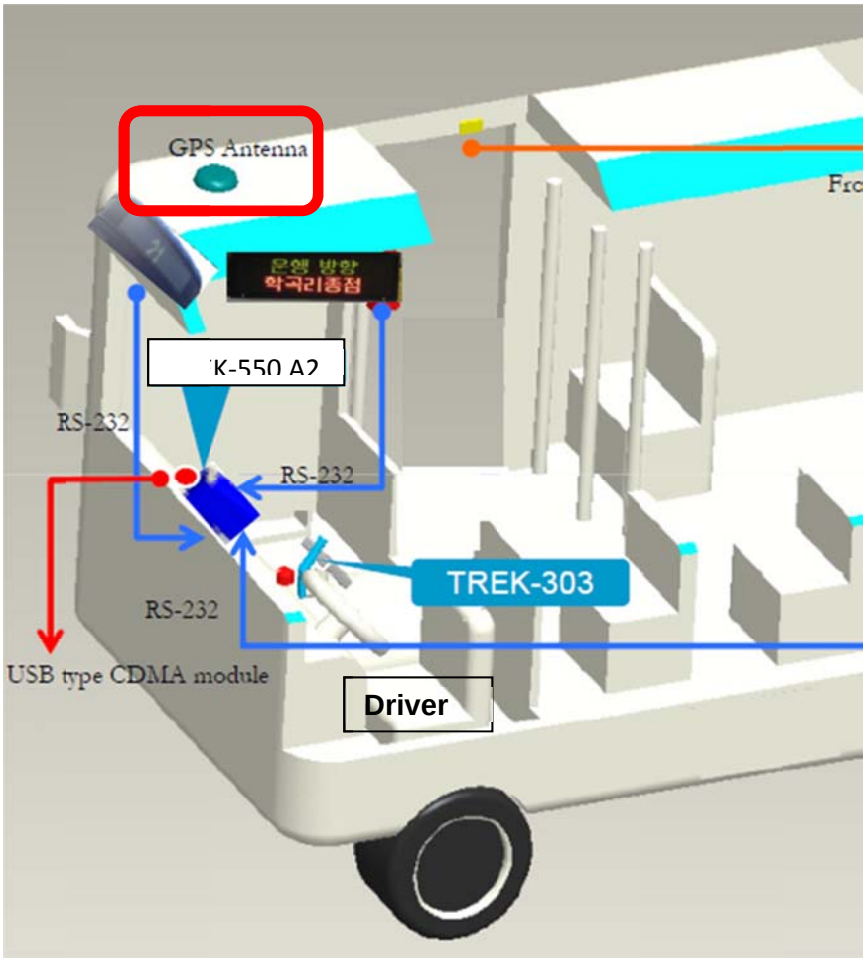
Wifi SMA Connector: Male connector



WWAN SMA Connector: Male Connector

TREK-550 Combo Antenna installation notice:

The antenna for this transmitter must be installed to provide **at least 20 cm** separation between the antenna and user.



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